Inch-Pound

MIL-P-23199D (SH)
18 November 1992
SUPERSEDING
MIL-P-23199C (SH)
8 February 1984
and Amendment 1
21 April 1989

MILITARY SPECIFICATION
PACKAGING AND PACKING REQUIREMENTS
FOR SPECIAL PURPOSE COMPONENTS AND REPAIR PARTS

This specification is approved for use by the Naval Sea Systems Command (NAVSEA), Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the requirements for packaging, packing, and marking of equipment, components, repair parts and tools (all hereinafter referred to as components, except as otherwise stated herein) to safeguard cleanliness, prevent damage and corrosion, and preserve identification during shipment and storage.

* 1.2 Application. This specification provides for three levels of packaging and packing (A, B and C) with applicability as specified in equipment specifications, ordering documents or other contractual requirement. The sections/paragraphs of this specification which apply to each level of packaging and packing are designated in Table I. The requirements for component storage on board ship (see 3.2.2.6, 3.3.1.1.1, 3.3.2 and 3.3.2.1) are as specified (see 6.1) or as stated in the contractual requirements.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 05Q4, Department of the Navy, Washington, DC 20362-5101, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSG PACK
AMSC N/A

Table I
Applicability of Requirements

Section or Paragraph		Levels of Packaging			Levels of Packing		
		A	B	C	A	B	C
1.0	Scope	x	x	x	x	x	x
2.0	Applicable Documents	x	x	x	x	x	x
3.1	General Requirements	x	x	x	x	x	x
3.2	Materials	x	x	x	x	x	x
3.2.1	Metallic Materials	x	x				
3.2.2	Non-Metallic Materials	x	x				
3.2.2.6.1	"Loose-Fill" Cushioning	x	x	x	x	x	x
3.2.3	Outer Container				x	x	
3.2.4	Marking & Labeling	x	x	x	x	x	x
3.3	Methods	x	x	x	x	x	x
3.3.1	Packaging	x	x				
3.3.2	Packing				x	x	
3.3.3	Labeling & Marking	x	x	x	x	x	x
3.4	Procedure	x	x	x	x	x	x
3.4.1	Packaging - Level A	x					
3.4.2	Packaging - Level B		x				
3.4.3	Packaging - Level C			x			
3.4.4	Packing - Level A				x		
3.4.5	Packing - Level B					x	
3.4.6	Packing - Level C						x
3.4.7	Pipe & Fittings	x	x	x	x	x	x
3.4.8	Shipment	x	x	x	x	x	x
3.4.9	Packaging, Packing and Shipping Plan	x	x		x	x	
4.0	Quality Assurance	x	x	x	x	x	x
4.1	Responsibility for Inspection	x	x	x	x	x	x
4.2	Lot Definition	x	x		x	x	
4.3	Sampling	x	x		x	x	
4.4	Inspection and Tests	x	x		x	x	
6.1	Ordering Data	x	x	x	x	x	x
6.2	Definitions	x	x	x	x	x	x

NOTE: Table I must be used in conjunction with ordering data for detail requirements.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

* 2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplements thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

TT-P-26 - Paint, Interior, White, Tints and Black, Fire Retardant.
PPP-T-60 - Tape, Packaging, Waterproof.
K-P-146 - Tarpaulins, Cotton Duck, FWNMR

L-P-375 - Plastic Film, Flexible, Vinyl Chloride
L-P-378 - Plastic Sheet and Strip, Thin Gauge, Polyolefin
L-P-390 - Plastic Molding and Extrusion Material, Polyethylene and Copolymers
PPP-B-566 - Boxes, Folding, Paperboard.
PPP-B-591 - Boxes, Shipping, Fiberboard, Wood-Cleated.
PPP-B-601 - Boxes, Wood, Cleated-Plywood.
PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
PPP-B-636 - Boxes, Shipping, Fiberboard.
PPP-B-640 - Boxes, Fiberboard, Corrugated, Triple-Wall.
PPP-B-665 - Boxes, Paperboard, Metal Edged and Components.
PPP-B-676 - Boxes, Set-Up.

MILITARY

MIL-C-104 - Crates, Wood; Lumber and Plywood Sheathed, Nailed and Bolted.
MIL-P-116 - Preservation, Methods of.
MIL-B-131 - Barrier Materials, Water-Vaporproof, Flexible, Heat Sealable.
MIL-B-233 - Box, Repair, Part, Storage.
MIL-S-901 - Shock Tests, H.I. (High Impact); Shipboard Machinery, Equipment and Systems, Requirements for.
MIL-D-3464 - Desiccants, Activated, Bagged, Packaging Use and Static Dehumidification.
MIL-C-3955 - Cans, Composite, Spirally Wound.
MIL-C-5584 - Containers, Shipping and Storage, Metal Reusable.
MIL-S-19491 - Semiconductor Device, Packaging of.
MIL-B-22191 - Barrier Material, Transparent, Flexible, Heat Sealable.
MIL-S-23192 - Spring, Helical, Age-hardenable, Nickel-Chromium-Iron
MIL-F-23467 - Fittings and Flanges, Seamless, Butt and Socket Welding, Wrought-Austenitic Corrosion-Resistant Steel
MIL-F-23508 - Fittings and Flanges, Seamless, Butt and Socket Welding, NI-CR-FE Alloy
MIL-F-23509 - Fittings and Flanges, Seamless, Butt and Socket Welding, Nickel-Copper Alloy
*MIL-P-24074 - Polytetrafluoroethylene Parts and Coatings and Polyamide Parts.
MIL-M-24130 - Metallic Seal Rings, Non-integral, General Specification for
MIL-S-24287 - Studs, Bolt Studs, Bolts, Nuts, Alloy Steel (for service to 700°F and fatigue applications)
MIL-F-24339 - Fittings and Flanges, Wrought, Seamless, Butt and Socket Welding, Carbon Steel
MIL-F-24342 - Fittings and Flanges, Wrought, Seamless, Butt and Socket Welding, 70-30 Copper-Nickel Alloy
MIL-S-24354 - Studs, Bolt-studs, Bolts, Nuts, Corrosion Resistant and Non Ferrous alloys.
*MIL-C-24457 - Container, Shipping and Storage, Metal, Reusable.
*MIL-C-24465 - Containers, Shipping and Storage, Metal, Reusable.
*MIL-P-24466 - Polyethylene Bags, Sheet, and Tubing, Green.
MIL-B-26195 - Boxes, Wood-Cleated, Skidded, Load-Bearing Base.
MIL-C-43006 - Cloth and Strip, Laminated, Vinyl-Nylon, High Strength, Flexible.
MIL-P-46144 - Plastic Sheet, Polycarbonate.
MIL-M-55565 - Microcircuits, Preparation for Delivery of.

MIL-C-58104 - Cover, Protective, For Parts and Equipment.
MIL-B-81705 - Barrier Materials, Flexible, Electrostatic-Free, Heat Sealable.
MIL-T-82120 - Tarpaulins; Duck, Cotton; Fire, Water, Water and Mildew Resistant Treated; with carrying bag
MIL-C-82255 - Cloth, coated, synthetic rubber (Nitrile and polychloroprene)
MIL-T-82288 - Tarpaulins; Laminated, Vinyl-Nylon, Flexible

STANDARDS

FEDERAL
FED-STD-191 - Textile Test Methods.

MILITARY
MIL-STD-129 - Marking for Shipment and Storage.
*MIL-STD-167-1 - Mechanical Vibrations of Shipboard Equipment (Type I - Environmental and Type II - Internally Excited).
*MIL-STD-167-2 - Mechanical Vibrations of Shipboard Equipment (Reciprocating Machinery and Propulsion System and Shafting) Type III, IV, and V.
*MIL-STD-767 - Cleaning and Cleanliness Control Requirements for Special Purpose Equipment.
MIL-STD-794 - Parts and Equipment, Procedures for Packaging of.
MIL-STD-1186 - Cushioning, Anchoring, Bracing, Blocking and Waterproofing; with Appropriate Test Methods.
*MIL-STD-2041 - Control of Detrimental Materials.
MS20003 - Indicator-Humidity, Card, Three Spot, Impregnated, Areas (Cobaltous Chloride).

HANDBOOK
MIL-HDBK-149 - Rubber and Rubber-Like Materials.

(Copies of documents marked with an asterisk should be obtained from the contracting activity or as directed by the contracting officer. Copies of other federal and military specifications, standards and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, Pa. 19111-5094.)

* 2.1.2 Other Government documents and publications. The following other Government documents and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DEPARTMENT OF TRANSPORTATION (DOT)

Code of Federal Regulations (CFR)
Title 14 - Aeronautics and Space
Chapter 1 - Federal Aviation Administration, Department of Transportation.
Subchapter F - Air Traffic and General Operating Rules.
Part 103 - Transportation of Dangerous Articles and Magnetized Materials.

Title 46 - Shipping
Chapter 1 - Coast Guard, Department of Transportation.
Subchapter E - Load Lines.
Subchapter G - Documentation and Measurement of Vessels.
Subchapter I - Cargo and Miscellaneous Vessels.

Title 49 - Transportation
Chapter 1 - Hazardous Materials Regulations Board, Department of Transportation.
Parts 171-178

Chapter III - Federal Motor Carrier Safety Regulations
Parts 390-399

(Application for copies of the Code of Federal Regulations should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20402.)

PUBLICATION

NAVAL SUPPLY SYSTEMS COMMAND (NAVSUP)
NAVSUP PUB 505 - Packaging and Packing of Hazardous Articles for Transport by Military Aircraft.

(Copies of specifications, standards and publications required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

* 2.2 Non-Government publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of documents cited in the solicitation.

AMERICAN BUREAU OF SHIPPING (ABS)
Rules for Building and Classing Steel Vessels

(Application for copies should be addressed to the American Bureau of Shipping, 65 Broadway, New York, NY 10006.)

NATIONAL FIRE PROTECTION ASSOCIATION
Handbook of Fire Protection

(Application for copies should be addressed to the National Fire Protection Association, 470 Atlantic Avenue, Boston, MA 02210.)

UNIFORM CLASSIFICATION COMMITTEE AGENT
Uniform Freight Classification Ratings, Rules and Regulations

(Application for copies should be addressed to the Uniform Classification Committee Agent, Tariff Publication Officer, Room 1006, 222 South Riverside Plaza, Chicago, IL. 60606.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

* 2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 General requirements.

3.1.1 Fire prevention and safety. In addition to the detailed requirements specified herein, materials and procedures used for handling, packaging, and packing as well as shipment and storage shall conform to the guidelines of the National Fire Protection Association Handbook for Fire Protection or equal.

3.1.2 Mercury contamination. During handling, packaging, packing, marking, and transportation, the product shall not come in direct contact with mercury or any of its compounds nor with any mercury-containing device employing a single boundary of containment.

* 3.1.3 Preservation of cleanliness. Prior to applying packaging in accordance with 3.3.1, the external surfaces of the component shall be cleaned to the extent that they are visibly free of grease, oil, dirt, scale, or foreign residue. The cleanliness of components cleaned in accordance with cleanliness controls (see 6.2) shall be maintained in accordance with the cleanliness and cleaning requirements of the cleanliness controls (see 6.2) during handling, packaging, packing, marking, and transportation.

3.1.4 Environmental control. Unless otherwise specified (see 3.3.1.6), components shall be packaged in air at atmospheric pressure.

3.1.5 Hazardous components. When hazards to personal safety are involved, special requirements shall be as specified (see 6.1), and in accordance with applicable codes and regulations.

3.2 Materials. The materials employed for packaging, packing, and marking shall be as provided herein.

3.2.1 Metallic materials. Metallic materials contacting surfaces of the article being shipped, or which might shed rust or scale into the interior of an article being shipped, shall be corrosion resistant and shall not cause galvanic corrosion at the contact area.

3.2.1.1 Lead restrictions. Lead or alloys containing lead shall not contact surfaces of nickel based alloy or stainless steel articles being shipped.

* 3.2.2 Nonmetallic materials. Nonmetallic packaging materials shall conform to this specification or shall be approved by NAVSEA or its authorized representative.

3.2.2.1 Contact preservatives and volatile corrosion inhibitors. The use of contact preservatives, volatile corrosion inhibitors, and other material intended to inhibit corrosion is prohibited, except as specified in 3.3.1.7.

3.2.2.2 Purge gas. Purge gas shall be dry inert gas (nitrogen or argon), free of dirt, oil, or halogens, and shall have a dew point of minus 40 degrees Fahrenheit (°F) or lower.

* 3.2.2.3 Desiccants and humidity indicators. Desiccants shall conform to MIL-D-3464, type III (type II for electrical components), and humidity indicating cards shall conform to MS20003.

* 3.2.2.4 Plugs and caps. Unless otherwise specified (see 6.1), nonmetallic materials for use in plugs and caps which come into direct contact with the components being packaged shall conform to L-P-390, MIL-P-24074 type I or III, or MIL-P-46144. The configuration of the plug or cap shall be as shown on figures 1 through 6. The following general requirements apply to the use of plugs and caps:

(a) For components to which MIL-STD-767 applies, plugs, caps, and tape shall conform to the requirements for temporary seals, plugs, and tape contained in MIL-STD-767 (for pipe and fittings, see 3.4.7).
(b) Simplicity of installation, inspection, and removal without damage to the component is required.
(c) For reusable seals, the size of the opening and the material for which the seal is intended shall be permanently marked on the plug or cap.
(d) The design of the plug or cap shall not interfere with component internals and shall preclude all parts thereof from falling into the opening in the component after installation. Plastic plugs or caps shall be sufficiently rigid to prevent them from being inadvertently pushed or drawn into the component after installation.
(e) Nonmetallic materials used for nonexpandable plugs and caps shall be brightly colored by the addition of a pigment coloring to the seal material in order that it can be more easily identified if the seal or a piece of the seal falls into component or system.
(f) The plug or cap shall be cleaned to the cleanliness requirement of the internal surfaces of the component to which it is applied.
(g) Pressure sensitive tape conforming to the requirements of PPP-T-60 and this specification may be used to further secure the plugs or caps and to protect the weld-end preparation but the tape shall not contact weld-end preparations.
(h) The use of cloth, paper, and plastic film for plugging and capping purposes is prohibited.
(i) Welding, soldering, or brazing to secure plugs and caps to the component and locking of fasteners by welding after installation of the cap on the component is prohibited.
(j) When required, the internal environment shall be controlled in accordance with 3.3.1.6.

* 3.2.2.5 Envelopes. Unless otherwise specified (see 6.1), envelopes shall be pigmented green polyethylene conforming to the requirements of MIL-P-24466. Envelopes shall be large enough to permit opening for inspection of contents, and resealing at least two additional times. Unless otherwise specified (see 6.1) envelopes shall be closed by heat sealing and the seals shall be capable of meeting the heat sealed seam test of MIL-P-116. Minimum cubage envelopes shall be suitable for placing directly into bins or drawers. Envelopes shall not be used where temperature limits of minus 75° to plus 175°F are exceeded, or as the sole method of packaging for outdoor applications involving extended exposure to extreme weather conditions.

* 3.2.2.5.1 Water-vaporproof envelopes. When specified (see 6.1), water-vaporproof envelope material shall conform to the requirements of L-P-375, L-P-378, MIL-B-131 or MIL-B-22191 (transparent). Polyvinylchloride (PVC) conforming to L-P-375 shall be subject to MIL-STD-767 guidelines if used on components cleaned in accordance with cleanliness controls (see 6.2). Water-vaporproof envelopes should not come in contact with components to which cleanliness controls apply (see 6.2). For these components, sealed envelopes (see 3.2.2.5) shall be placed between the component and the water-vaporproof envelope.

* 3.2.2.6 Cushioning. Materials for cushioning required to protect components from shock and vibration damage and resist puncture and tearing of envelopes shall be in accordance with MIL-STD-1186 and this specification (see 3.3.1.1, 3.3.1.1.1 and 3.3.1.8). Plastic materials shall not be used for cushioning any component for storage on-board ship unless required to provide the necessary degree of physical and mechanical protection, subject to approval by NAVSEA or its authorized representative.

* 3.2.2.6.1 "Loose fill" cushioning. Unless otherwise specified (see 6.1), "loose-fill" material is prohibited. When "loose-fill" material is specified, unit packages and containers shall be marked or labelled as follows:

"CAUTION:

Contents are cushioned with 'loose-fill' material. Remove and discard 'loose-fill' before shipboard storage of contents. If required, re-cushion with cellulosic material, bound fiber, fiberboard, transparent flexible cellular material, or other approved materials."

* 3.2.3 Outer containers. The selection of the container shall be at the option of the contractor provided that the container complies with the requirements herein and the requirements of the container specification, such as maximum weight of contained items, type of load, and method of closure and strapping. Shipping containers, when used to pack the same components, shall be of similar construction, and minimum cube and tare; shall provide the consistent protection required; and shall contain identical components when practicable. The packaged components shall be packed for shipment in fiberboard boxes, containers, steel boxes, crates, wood boxes, or in other nonmagnetic repair parts boxes conforming to the following, as applicable:

MIL-C-104	- Crates, Wood, Lumber, and Plywood Sheathed, Nailed and Bolted.
MIL-B-233	- Boxes, Repair Parts, Storage.
PPP-B-591	- Boxes, Shipping, Fiberboard, Wood-Cleated.
PPP-B-601	- Boxes, Wood, Cleated-Plywood.

PPP-B-621	- Boxes, Wood, Nailed and Lock-Corner.
PPP-B-636	- Boxes, Shipping, Fiberboard.
PPP-B-640	- Boxes, Fiberboard, Corrugated, Triple-Wall.
MIL-C-5584	- Containers, Shipping and Storage, Metal, Reusable.
MIL-C-24457	- Containers, Shipping and Storage, Metal, Reusable.
MIL-C-24465	- Containers, Shipping and Storage, Metal, Reusable.
MIL-B-26195	- Boxes, Wood-Cleated, Skidded, Load-Bearing Base.
MIL-C-58104	- Cover, Protective, For Parts and Equipment.

* 3.2.3.1 Wood boxes. The gross weight of a wood box including contents shall not exceed 200 pounds, except that the weight of a box containing an individual component may exceed this amount. Wood boxes used for the shipment of components (including packaging and packing) weighing more than 200 pounds or for components secured to the base shall be modified by the addition of nominal 2 by 4 inch skids placed with the 4-inch dimension flat. The components shall be bolted through the base and skids or equal reinforcement with machine bolts wherever practicable.

3.2.3.2 Crates. Components exceeding 800 pounds gross weight shall be packed in crates conforming to MIL-C-104. For skid-type base crates, wooden blocking shall be affixed to the crate base to prevent fork-lifting of crates from the ends. The blocking shall not extend beyond the sheeting envelope, shall be permanently attached, and shall not interfere with the sling handling of the crate.

* 3.2.3.3 Metal containers. Metal containers shall conform to the requirements of MIL-C-5584, MIL-C-24457, and MIL-C-24465 as applicable and the following additional requirements:

(a) One container of each design of reusable on-board metal storage and shipping container shall be tested in accordance with MIL-S-901, MIL-STD-167-1, and MIL-STD-167-2 as applicable, at the shipboard shock and vibration conditions given in the component specification, or as specified (see 6.1).
(b) Container design shall be subject to the approval of NAVSEA or its authorized representative.
(c) Each container shall be leaktight at an internal purge gas pressure of 4 to 6 pounds per square inch gage (psig).
(d) Mounting and cushioning material surfaces in contact with the component shall meet the requirements of 3.2.1.
(e) When specified (see 6.1), reusable shipping containers and reusable on-board storage and shipping containers, when used to ship hazardous materials, shall meet the requirements of the Code of Federal Regulations Title 49, Chapter 1, Parts 171-178. The level and type of radioactivity emitted from the material, to be shipped shall be specified. An unmarked area at least 6 by 2 inches or 12 by 1 inches suitable for later marking shall be provided on the container.
(f) When specified (see 6.1), a preproduction model consisting of one complete pack of the component(s) in its reusable metal shipping container shall be submitted to NAVSEA or its authorized representative for the test specified (see 4.2.2, 4.3 and 4.4.). Dummy loads shall be substituted for the actual component for each of the tests specified in 3.2.3.3 and 4.4.5.

* 3.2.3.4 Fiberboard boxes. The gross weight of a fiberboard box, including contents, shall not exceed 70 pounds, except where an individual packed component exceeds this amount. When specified (see 6.1), a wooden apron shall be added around the base of fiberboard shipping containers to protect the contents from forklift damage.

* 3.2.3.5 Intermediate Containers. Intermediate containers shall conform to the following requirements as applicable for the type of container selected or required:

PPP-B-566	-	Boxes, Folding, Paperboard.
PPP-B-636	-	Boxes, Shipping, Fiberboard.
PPP-B-665	-	Boxes, Paperboard, Metal Edged and Components.
PPP-B-676	-	Boxes, Set-Up.
MIL-C-3955	-	Cans, Composite, Spirally Wound.

3.2.4 Marking and labeling. Materials for marking and labeling for shipment shall be in accordance with MIL-STD-129.

* 3.3 Methods. Packaging, packing, and marking methods shall meet requirements specified herein (see 3.4). In cases where it is not considered practical to package, pack, or mark components in accordance with this specification, the vendor shall identify and provide justification to NAVSEA or its authorized representative which requirements are considered to be impractical. An alternate method or procedure shall be approved by NAVSEA or its authorized representative which meets the intent of this specification (see 3.4.9). The requirements of MIL-STD-794 are recommended for reference in considering alternate methods and procedures for approval.

* 3.3.1 Packaging. Components shall be individually packaged in accordance with the following methods for the level of packaging required, unless otherwise specified (see 6.1).

* 3.3.1.1 Packaging in sealed envelopes. Components which are subject to cleanliness controls (see 6.2) or as specified (see 6.1) shall be packaged in sealed envelopes (see 3.2.2.5 and 3.2.2.5.1). Components weighing 10 pounds or less shall be packaged in a single layer of 0.004 inch minimum thickness. Components weighing between 10 and 70 pounds shall be packaged in envelopes having a minimum total thickness of 0.008 inch (achievable by overpackaging within two separately sealed envelopes of 0.004 inch minimum thickness, each containing the same environment). Components weighing 70 or more pounds may be similarly packaged in envelopes having a minimum total thickness of 0.008 inch subject to prior approval of NAVSEA or its authorized representative. Projections which might pierce the envelope or be damaged during shipping and handling, including threads on externally threaded parts, shall be wrapped or cushioned with material conforming to the material requirements for envelopes (see 3.2.2.5 and 3.2.2.5.1), and secured to the component prior to insertion into the envelope. Acceptable protection of threads on externally threaded parts will be provided by installation of polyethylene mesh tubing conforming to L-P-390, in lieu of wrapping with envelope material. If the envelope will contain material other than the component (e.g., cushioning), all component openings shall be sealed as necessary to preclude entry of any portions of the additional material. Prior to sealing the envelope excess atmosphere shall be expelled by reducing the envelope to its smallest volume practicable without damage to the component.

* 3.3.1.1.1 Intermediate packaging. For level B packaging, intermediate containers (see 3.2.3.5) shall be used to package components which are fragile, delicate, or have critical finished external surfaces susceptible to point contact damage, prior to placement in outer containers. The component in the sealed envelope shall be packaged in a close fitting folding carton, set-up box, metal stayed box, fiberboard box, metal can with a crimped or taped closure or in a spiral wound fiber can. The packaged component shall be cushioned and braced within the intermediate container in a manner to prohibit movement and resulting damage to the envelope and to protect the components from damage due to shock or vibration in accordance with MIL-STD-1186. Components, such as, but not limited to, glass lenses, electronic chassis and assemblies, and ground shafts, shall be packaged by this method. For protection and convenience of handling, other components may be packaged in this manner.

Intermediate packaging of components for storage on board ship shall to the maximum extent practicable utilize fire retardant materials, provide minimum volume packaging, and shall not use plastic material unless required to provide the necessary degree of physical, mechanical, or environmental protection, subject to approval by NAVSEA or its authorized representative.

* 3.3.1.2 Sealing with expandable plugs. Unless otherwise specified (see 6.1), expandable plugs (see 3.2.2.4) shall be used for sealing nozzles up to but not including 6 inches in internal diameter except as allowed in 3.3.1.3. The nonmetallic seal material (see figure 1), shall be approximately 1/2 inch thick and, when compressed between metal plates, will expand in diameter and seal off the opening.

* 3.3.1.3 Sealing with nonexpandable plugs and caps. Unless otherwise specified (see 6.1), nonexpandable plugs and caps (see 3.2.2.4) may be used for sealing openings up to but not including 6 inches in internal diameter, providing pressurization with purge gas or evacuation (see 3.3.1.6) is not required or specified. If pressurization or evacuation is specified, nonexpandable plugs and caps may be used to seal openings 2 1/2 inches or less in internal diameter. They shall be single piece construction, shall fit tightly, and may be taped to the component when required to prevent loosening (see figures 2, 3, 4, and 5). When used to seal an opening with a weld preparation, the entire weld preparation shall be covered or otherwise protected. The tape shall not contact the weld-end preparation.

* 3.3.1.4 Sealing with shipping caps. Unless otherwise specified (see 6.1), shipping caps (see 3.2.2.4) shall be used for sealing openings of 6 inches or larger internal diameter. The gasket of the shipping cap shall be bonded to the cover plate to prevent the gasket or pieces of the gasket from entering the component (see figure 6).

* 3.3.1.5 Sealing in metal containers. Large components having critical internal or external surfaces, or both, which cannot be effectively sealed, may be packaged in sealed metal containers (see 3.2.3.3). Unless otherwise specified (see 6.1), components such as, but not limited to, large pumps and motors, shall be packaged by this method. When specified (see 3.3.1.6), the container shall be purged.

* 3.3.1.6 Environmental control. When environmental control is specified (see 6.1) to protect components fabricated from materials which will deteriorate upon exposure to atmospheric conditions the following methods as applicable shall be used:

* 3.3.1.6.1 Purging of sealed components. Purging shall be performed by pressurizing the component or metal container to 4 to 6 psig unless otherwise specified (see 6.1), with purge gas (see 3.2.2.2) and then venting to atmospheric pressure for at least four complete cycles. At the completion of the last cycle, the component or container shall be sealed off when atmospheric pressure is reached. When specified (see 6.1), evacuation to 50 millimeters of mercury (or equal) absolute pressure may be employed for purging. The containers shall be filled with purge gas to atmospheric pressure after evacuation. Thin-walled containers or components which are not capable of withstanding a vacuum shall be purged by the pressurizing and venting method. When specified (see 6.1), the purged component or container shall be pressurized with purge gas at 4 to 6 psig unless otherwise specified (see 6.1), and sealed.

* 3.3.1.6.2 Purging of sealed envelopes. Envelopes shall be purged by pressurizing the envelope to 4 to 5 psig unless otherwise specified (see 6.1), with purge gas. Large envelopes may be through-purged. After the air has been expelled by introduction of purge gas, the purge gas shall be allowed to flow through for 1 minute prior to sealing the vent hole(s). The envelope shall then be pressurized to 4 to 5 psig unless otherwise specified (see 6.1), with purge gas. Prior to sealing the envelope excess gas shall be expelled by reducing the envelope to its smallest volume practicable without damage to the component.

* 3.3.1.6.3 Desiccants and humidity indicating cards. Components or containers shall be packaged with desiccants and humidity indicating cards (see 3.2.2.3). The required number of bags of desiccants shall be determined by the following equation and rounded off to the next larger whole number.

Number of bags of desiccant
(16 unit bag size) = 0.076v

Where V = total internal volume of the equipment, component, repair part or container in cubic feet.

The desiccant shall be in bags of standard size, which shall be placed in one or more nylon bags; the bags tied and placed in one or more perforated metal canisters. The canister(s) shall be attached to the interior of the component or container, preferably through a manway or handhole, so as to prevent movement and contact with critical surfaces. Insofar as practicable, the desiccant shall be so located in the package to expose all voids in the component and package interior to the dehydrating action of the desiccant. The humidity indicating card shall be secured in a manway or handhole, if provided, or inside an opening that has been sealed using a transparent rigid, nonhalogenated cap such that the card can be monitored without admitting air to the component or container. To avoid misleading indications, the card shall not be placed directly adjacent to the desiccant. The humidity indicating card shall be installed to facilitate viewing during storage. Methods of implementing requirements for desiccants and humidity indicating cards shall be approved by NAVSEA or its authorized representative.

* 3.3.1.7 Preservation. Preservatives in accordance with MIL-P-116 shall be applied to those surfaces on which corrosion in any form as a result of exposure to air or moisture would impair the usefulness or function of the part or assembly. Preservatives applied to water or steam wetted surfaces

shall be limited to MIL-P-116, type P-21. Unless otherwise specified (see 6.1), preservatives shall not be applied to the following:

(a) Corrosion-resistant materials.
(b) Electrical Parts.
(c) Items whose function would be impaired by the application of the preservative or as a result of the means used to remove the preservative.
(d) Surfaces protected by vitreous or plastic coatings, plating, or painting.
(e) Surfaces cleaned in accordance with cleanliness controls (see 6.2).

* 3.3.1.8 Semi-conductors utilized as repair parts. In addition to the other requirements of this specification, semiconductor devices such as diodes, transistors, and integrated circuits, as well as circuit boards, or chassis in which they are incorporated, shall be individually unit packaged in a barrier material conforming to MIL-B-81705, type 1. When MIL-B-81705 barrier material is used for individual unit packaging of semiconductor devices, use of other barrier material is not required. Leads and terminals of semiconductor devices shall be protected in accordance with MIL-S-19491. Microcircuits shall be packaged in accordance with MIL-M-55565 level B packaging and level C packing, unless otherwise specified (see 6.1).

* 3.3.2 Packing. Unless otherwise specified (see 6.1), each package or component shall be separately packed, except for repair parts and tools (see 3.3.2.1). The package(s) or component(s) shall be cushioned, blocked, and braced within the container (see 3.2.2.6) in a manner to prohibit movement and resulting damage to the component (and the sealed envelope when no intermediate packaging is used) in conformance with MIL-STD-1186.

Packing for any component for storage on board ship shall be fire retardant to the maximum extent practicable. Use of coatings, such as paint in accordance with TT-P-26, to achieve fire retardant characteristics shall be approved by NAVSEA or its authorized representative.

* 3.3.2.1 Packing for Repair Parts and Tools. Repair parts and tools may be separately or multiple packed in one shipping container unless otherwise specified (see 6.1) subject to the requirements of this specification. When specified (see 6.1), on board repair parts and tools shall be packed in repair parts storage boxes or containers (see 3.2.3) conforming to MIL-B-233, type M, MIL-C-5584, MIL-C-24457, or MIL-C-24465. When specified (see 6.1), repair parts or tools shall be packed with the equipment for which they are intended.

The gross weight of parts or tools shall not exceed 200 pounds in any one repair part box. Where the combined weight of a set exceeds 200 pounds, such parts or tools shall be grouped and packed in two or more boxes. An exception will be made when an individual repair part or tool weighs in excess of 200 pounds, in which case the repair part or tool shall be packed in an individual repair part box. Where more than one box is required to pack a set of repair parts, the boxes shall be numbered consecutively to show the number of boxes in a complete set.

Packing of repair parts for storage on board ship, for which no intermediate packaging is provided, shall to the maximum extent practicable provide minimum volume packing, fire retardant materials, and shall not use

plastic material unless required to provide the necessary degree of physical, mechanical, or environmental protection, subject to approval by NAVSEA or its authorized representative.

* 3.3.3 Labeling and marking.

* 3.3.3.1 Packages and shipping containers. In addition to any special labeling or marking required by the Department of Transportation, contractual requirements and as specified (see 6.1), packages, intermediate packages, and shipping containers shall be labeled and marked for shipment in accordance with MIL-STD-129 and the following.

* 3.3.3.1.1 Precautionary marking. Unit packages or intermediate packages if provided shall be marked with the following precautionary marking: "INTERMEDIATE PACKAGE - DO NOT REMOVE FOR WAREHOUSE STORAGE - DO NOT OPEN EXCEPT FOR USE OR AUTHORIZED INSPECTION". When components are cleaned in accordance with cleanliness controls (see 6.2), packages, and intermediate packages if provided, shall be marked "DO NOT OPEN, INSPECT OR REPACKAGE EXCEPT IN CLEAN AREA IN ACCORDANCE WITH MIL-STD-767". For components with cleanliness controls (see 6.2) other than MIL-STD-767, packages and intermediate packages shall be marked "FINAL CLEANING MAY BE REQUIRED". Shipping containers shall be marked with the following precautionary marking, prominently located: "WAREHOUSE STORAGE ONLY". When desiccant is used warning notices shall be placed on the component or container to indicate the location and quantity of desiccant in the unit and the location of the humidity indicating card.

* 3.3.3.1.2 Exterior marking for heat-sealed packages. For level B packaging without intermediate containers, the final packed items shall state on the outer cover that "Exterior packaging down to, but not including the sealed envelope, may be removed by end users prior to placement in bin or drawer storage to reduce the package to minimum cube. Packing is not to be removed for warehouse storage".

* 3.3.3.1.3 Exterior marking for intermediate packages. The final packed items shall state on the outer cover that "Exterior packaging down to, but not including the intermediate package, may be removed prior to placement in bin or drawer storage to reduce the package to minimum cube".

* 3.3.3.1.4 Packing lists. Packing lists shall be attached to the exterior of the shipping container and shall also be placed inside in accordance with instructions in MIL-STD-129 and other contractual requirements.

* 3.3.3.1.5 Preservative labeling. When preservative is approved used, a note shall be placed on the unit package label and the shipping documents stating the need and method of preservative removal prior to component use.

* 3.3.3.1.6 Repair parts. Packages and packs of repair parts and tools shall be clearly identified as repair parts and tools, as applicable.

* 3.3.3.1.7 Bar code marking and labels. Identification labels shall be secured inside the envelope with the component or heat-sealed in a section (tab end) separated from the component so as to be permanently legible. When bar code markings are required (for example, as an ordering data option of MIL-STD-129) and cannot be read through the envelope, such as with green polyethylene, a label consisting of the bar code and national stock number

shall be permanently affixed to the outside of the envelopes. The bar code label is in addition to the information label secured inside the envelope.

3.4 Procedure. Components shall be packaged, packed and prepared for shipment using procedures selected according to the following criteria for the levels specified (see 6.1).

* 3.4.1 Packaging - level A. This packaging level shall provide the degree of preservation and packaging of components which will afford adequate protection against corrosion, deterioration and physical damage during handling, shipment, indeterminate storage and world-wide redistribution. Components shall be packaged in accordance with the method or combination of methods as specified (see 3.3.1).

* 3.4.2 Packaging - level B. This packaging level shall provide the degree of preservation and packaging of components at the time of procurement to assure minimum cube packaging and maximum preservation without the need for reprocessing for interim protected storage. Components shall be packaged in accordance with the method or combination of methods as specified (see 3.3.1).

3.4.3 Packaging - level C. This packaging level, which is the supplier's commercial practice, shall ensure maintenance of the required degree of cleanliness and provide adequate protection against corrosion, deterioration and physical damage during handling, shipment from the supply source, and indeterminate storage by the receiving agency.

* 3.4.4 Packing - level A. This packing level shall provide the degree of packing which will afford adequate protection during shipment, handling, indeterminate storage, and world-wide redistribution. Components or packages shall be packed in overseas type, exterior grade containers as applicable (see 3.2.3 and 3.3.2). Shipping container shall be closed and strapped in accordance with the appendix of the applicable container specification. Repair part boxes conforming to MIL-B-233 shall be overpacked in outer containers specified herein.

* 3.4.5 Packing - level B. This packing level shall provide the degree of packing which will afford adequate protection during multiple domestic reshipments. Components or packages shall be packed in the appropriate domestic type outer container designed to be shipped and handled under cover and stored in warehouses or other structures affording equivalent protection from weather (see 3.2.3 and 3.3.2). Repair part boxes conforming to MIL-B-233 require no over packing for shipment.

3.4.6 Packing - level C. This packing level shall provide the degree of packing which will afford protection against damage during domestic shipment, and will conform to applicable carrier rules and regulations. The components or packages shall be cushioned and packed in commercial containers of the type, size, and kind commonly use used for the purpose, in a manner which will ensure acceptance by common carrier, withstand multiple reshipments and ensure safe delivery at destination. Containers shall conform to the Uniform Freight Classification or regulations of other carriers as applicable to the mode of transportation.

* 3.4.7 Pipe and fitting. Unless otherwise approved or specified (see 6.1) packaging and packing shall be in accordance with the following levels:

Packaging level	Packing level	Destination and use
A (3.4.1)	B (3.4.5)	Interim storage and subsequent reshipment.
C (3.4.3)	C (3.4.6)	For immediate use by the receiving activity.

The ends of the pipe or fitting shall be covered with close fitting wooden or plastic plugs secured with pressure-sensitive tape in accordance with 3.2.2.4(g). To ensure cleanliness requirements are maintained in accordance with 3.2.2.4(f), wooden plugs must be covered with green polyethylene or other approved material which prevents wood or related residue from contaminating the pipe or fitting.

Pipe or fittings shall be protected by wrapping in green polyethylene sheet in accordance with MIL-P-24466, sealing with pressure sensitive tape, and bracing and blocking within the outer container as required by MIL-STD-1186. Purging, desiccants, and humidity indicators are not required. Outer containers shall be wooden boxes or crates as applicable (see 3.2.3) designed to permit fork lifting.

* 3.4.8 Shipment. The supplier shall be responsible for loading the components onto the shipping vehicle, securing the load for travel and, if the vehicle is not covered, covering the load with a tarpaulin. Tarpaulins used for protection of component shipments shall be water repellant and provide dependable protection for all weather conditions experienced. Tarpaulins shall be in accordance with either MIL-C-43006, MIL-T-82120, MIL-C-82255, MIL-T-82288 or K-P-146. Tarpaulins to equivalent industry standards are acceptable. Except when provided by NAVSEA or its authorized representative, the supplier shall also provide the shipping rig and tiedown hardware.

3.4.8.1 Rail shipment of large components. When specified (see 6.1), rail shipments of components are prohibited. This includes shipments made by truck which are later "piggybacked" by rail. When rail shipment is used, a packaging, packing, and shipping plan (see 3.4.9) shall be submitted to NAVSEA or its authorized representative prior to actual shipment. "DO NOT HUMP" signs shall be placed on each rail car used for shipment and each rail car shall be equipped with an impactograph. Where feasible, the impactograph shall be mounted on the item being shipped, the shipping cradle, or the shipping container. The record charts of each impactograph shall be sent to NAVSEA or its authorized representative after review at the point of destination.

3.4.8.2 Overseas and domestic water shipments. When shipment outside the continental limits of the United States or by water to a domestic destination is necessary, a packaging, packing, and shipping plan (see 3.4.9) shall be submitted to NAVSEA or its authorized representative prior to actual shipment.

3.4.8.3 Air shipment of hazardous articles. When air shipment of hazardous articles is specified (see 6.1), shipment shall be in accordance with the requirements of NAVSUP Pub 505 and Code of Federal Regulations, Title 49, Chapter 1, Parts 171-178.

* 3.4.9 Packaging, packing and shipping plan. Detailed procedures and drawings which specify the methods that will be used to clean, preserve, package, pack, mark, and ship components in accordance with the requirements of this specification are required. When required by 3.4.8.1, 3.4.8.2, in the equipment specification, or specified in ordering data (see 6.1), these procedures shall be submitted for approval by NAVSEA or its authorized representative. Alternate procedures submitted for approval (see 3.3) shall include the information listed below as applicable. When specified (see 6.1), the design report calculations to justify the skid, frame and arrangement details, and the methods of supporting, bracing, blocking and securing components to the transportation vehicle, and a stability analysis (e.g. list and trim) for water shipments shall be submitted for approval to NAVSEA or its authorized representative. Procedures including inspection and testing techniques and handling equipment shall incorporate, but not be limited to, the following, as applicable (different or additional information may be required for a specific component):

(a) Method of cleaning and preservation, and materials used; method of removing preservative.
(b) Method of purging, pressurization, or evacuation.
(c) Method of plugging, sealing, and wrapping for protection.

(1) Location of plugs, materials used, method of securing.
(2) Sealing technique.
(3) Wrapping material.

(d) Method of packaging and materials used.
(e) Method of environment control with desiccant and humidity indicators.
(f) Method of packing, including drawings and materials for:

(1) Cushioning, blocking, bracing, and anchoring.
(2) Crating, boxing, and containerization.
(3) Details of skids, frames, or mounting arrangement including bolting and tiedown, proposed.
(4) Instrumentation such as impactographs, accelerometers, or other.
(5) Type of transportation such as truck, rail car, or other vehicle.
(6) Details of method of supporting, bracing, blocking, and securing the equipment to the transportation vehicle (truck, rail car, etc.).
(7) Whether exclusive use of transportation vehicle (truck, rail car, etc.) is recommended.
(8) Instructions to consignee of off-loading procedures to ensure no damage occurs to reusable containers, skids, frames, etc., and instruction on how to prepare and return reusable containers to the originator.
(9) Special routing and consignment instructions.

(g) Method of installing or removing the component from the container if not described in the equipment or component technical manual.
(h) Method of storage recommended if not specified in the technical manual.
(i) Method of identification and marking to meet applicable contract requirements.

(1) Information identifying component origin and destination for traceability.
(2) Restriction or precautions regarding handling, for example, "DO NOT HUMP".
(3) Technique and location of marking, for example, tags, labels, stencils within package or on packing crate; samples of tags, labels, etc. should be submitted.
(4) Method of attaching the material inspection and receiving report (DD Form 250) and the Request for Approval of Degradation of Specification Requirements and other documents as required.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.2 Lot definitions.

4.2.1 Acceptance inspection. For the purpose of selecting samples to be inspected for compliance with the requirements of this specification, a lot shall consist of all packages processed by the same method and submitted for quality acceptance at one time.

4.2.2 Preproduction inspection. The preproduction lot shall be the preproduction model required by 3.2.3.3(f). After approval of the preproduction lot, no additional tests are required unless changes have been made in the packaging process or materials.

4.3 Sampling.

4.3.1 Sampling for visual inspection. Each package shall be inspected.

* 4.3.2 Sampling for pressure retention tests. Each metal container to be pressurized with purge gas shall be tested.

4.3.3 Sampling for rough handling test. The preproduction model specified in 3.2.3.3(f) shall be tested.

4.3.4 Sampling for shock and vibration test. One preproduction model of each design of reusable on-board, metal, storage and shipping container shall be tested.

4.4 Inspection and tests.

4.4.1 Visual tests.

* 4.4.1.1 Procedure. All packaging and packing shall be visually inspected to determine compliance with the requirements in 3.1 through 3.4.9, as applicable.

* 4.4.1.2 Acceptance criteria. Packaging and packing which fails to conform to the requirements of 3.1 through 3.4.9, as applicable, shall be rejected.

4.4.2 Pressure retention test.

* 4.4.2.1 Procedure. The metal container without its load shall be filled with filtered air and unless otherwise specified (see 6.1), pressurized to a minimum of 10 psig. Evidence of leakage in metal containers shall be detected by loss of pressure, which shall be measured by means of a connected pressure gage graduated in ounces or equal; or by observance for air bubbles during immersion of the pressurized container in water, or after coating the outer surface of the pressurized container with water-soap solution. If the loss of gage pressure method is used after pressurization of the container from a high pressure gas source, the initial reading for the 30 minute hold period shall not be taken until the contents of the pressurized container have come to ambient temperature.

4.4.2.2 Acceptance criteria. Any pressurized metal container which shows a loss of gage pressure over a 30 minute period, or the presence of escaping gas bubbles during immersion of the container in water, or shows signs of leaking after coating the outer surfaces of the container with soap solution shall be rejected.

4.4.3 Procedure in case of failure. Rejected units shall be corrected or replaced with acceptable units. The supplier shall maintain detailed records indicating all corrective action taken.

4.4.4 Rough handling test.

* 4.4.4.1 Procedure. The preproduction model specified in 3.2.3.3(f) shall be tested in accordance with the preproduction tests in MIL-P-116 except packages in metal containers conforming to MIL-C-5584 or MIL-C-24457 shall be tested in accordance with the rough handling tests of MIL-C-5584 or MIL-C-24457, as applicable. Specified tests apply to the first article inspection of the preproduction model with dummy loads that mock-up the size, shape, and distribution of the component(s) within the container. Unless otherwise specified (see 6.1) a final first article inspection shall not be conducted. Subsequent to the rough handling test, the preproduction model shall be tested in accordance with 4.4.2 and MIL-C-5584. When specified (see 6.1), functional tests shall be performed on the tested component to determine freedom from operational malfunction after passing the required handling testing.

4.4.4.2 Acceptance criteria. If materials and components comprising the method of sealing, packaging, and packing show evidence of damage or evidence of displacement which affects the utility of the packing method or the operational characteristics of the component, the sealing, packaging, or packing methods shall be changed and another preproduction model conforming to the new methods shall be tested.

4.4.5 Shock and vibration test.

* 4.4.5.1 Procedure. The preproduction model, reusable and on-board storage metal container (see 3.2.3.3(f)), containing dummy loads which mock-up the dimensions, weights, and weight distribution of the component and unless otherwise specified (see 6.1) pressurized to a minimum of 10 psig with air, shall be tested to the requirements given by 3.2.3.3(a). During the test, the container shall be supported in the manner and position required for on-board stowage.

4.4.5.2 Acceptance criteria. The container shall not deform sufficiently to lose pressure or to contact the dummy load in such a way that damage to the component shipped might ensue.

4.4.6 Inspection of transportation.

4.4.6.1 Truck shipments. When the weight of the shipment exceeds 6,000 pounds or 25 percent of the rated capacity of the truck, or when exclusive use of the truck is specified to the carrier, the vehicle shall be inspected in accordance with figure 7, Inspection Report - Trucks and Trailers. The inspection report may be in the format shown on figure 7. Trucks and trailers with unsatisfactory conditions shall not be used for shipment of components under this specification.

4.4.6.2 Rail shipments. When weight of the shipment exceeds 25 percent of the rated capacity of the railcar or when exclusive use of a railcar is specified to the carrier, the railcar shall be inspected in accordance with figure 8, Inspection Report - Railroad Cars, and Railcar Inspection of Shipment Railcars, UFC-3. The inspection report may be in the format shown on figure 8. Railcars with unsatisfactory conditions shall not be used for shipments of components under this specification.

4.4.6.3 Barge shipments. When the weight of the barge is 100 gross tons or over and will require seagoing shipment, the barge shall be inspected in accordance with figure 9, Inspection Report - Barges, Seagoing. The inspection report may be in the format shown on figure 9. Barges with unsatisfactory conditions shall not be used for shipments of components under this specification.

5. PREPARATION FOR DELIVERY

This section is not applicable to this specification.

6. NOTES

* 6.1 Ordering data. Procurement documents shall specify the following:

(a) Title, number, and date of this specification.
* (b) Whether requirements for storage on board ship are applicable (see 1.2). (Reference 3.2.2.6, 3.3.1.1.1, 3.3.2, and 3.3.2.1)
(c) Special requirements when hazards to personal safety are involved (see 3.1.5).
(d) When material to be used for plugs and caps may be other than specified (see 3.2.2.4).
* (e) Whether envelope other than green polyethylene, closure by other than method specified or water-vaporproof envelope, is required (see 3.2.2.5 and 3.2.2.5.1).

(f) Whether use of "Loose-Fill" material is permitted (see 3.2.2.6.1).
(g) Whether shock and vibration requirements for on-board storage and shipping containers is required if not given in the equipment specification (see 3.2.3.3(a)).
(h) Whether reusable metal containers shall meet the requirements of the Code of Federal Regulations, Title 49, Chapter 1, Parts 171-178 for transport of hazardous materials (see 3.2.3.3(e)).
(i) Whether a preproduction model pack of the component in its shipping container is required to be submitted for approval (see 3.2.3.3(f)).
(j) Whether fiberboard box requires wooden apron (see 3.2.3.4).
(k) 1. Whether the quantity per unit package for the item is other than one (see 3.3.1).
2. Method or combination of methods of packaging to be used when packaging other than in accordance with paragraph 3.3.1.1 only (see 3.3.1).
* 3. Whether sealed envelopes are required for components not subject to cleanliness controls (see 3.3.1.1).
* (l) Whether requirements for plugs and caps are other than specified (see 3.3.1.2, 3.3.1.3 and 3.3.1.4).
* (m) Whether components do not require packaging by sealing in metal containers (see 3.3.1.5).
* (n) Whether environmental control or purging of component, container, or envelope, and use of desiccants/humidity indicating card is required to prevent deterioration upon exposure to atmospheric conditions (see 3.3.1.6).
(o) 1. Whether evacuation before purging and purging of sealed components and metal containers is required (see 3.3.1.6.1).
2. Whether the purged component or container shall be pressurized, with purge gas (see 3.3.1.6.1).
* 3. Whether purge gas and pressurization pressure is other than specified (see 3.3.1.6.1).
* 4. Whether envelope pressure is other than specified (see 3.3.1.6.2).
(p) Whether preservatives for special items listed are required (see 3.3.1.7).
* (q) Whether packaging and packing are other than specified (see 3.3.1.8).
(r) 1. Whether each package or component does not require a separate pack (see 3.3.2).
* 2. Whether repair parts storage boxes or containers are required for on-board repair parts and tools (see 3.3.2.1).
* 3. Whether special tools should be packed with the equipment for which they are intended (see 3.3.2.1).
* 4. Number of items in each container if other than specified (see 3.3.2.1).
(s) Special marking requirements (see 3.3.3.1).
* (t) Packaging and packing procedure levels to be used (see 3.4 and 3.4.7).
(u) Whether rail shipment is prohibited (see 3.4.8.1).
(v) Whether air shipment of hazardous articles is required (see 3.4.8.3).

(w) 1. Whether a packaging and packing plan is to be submitted for approval prior to shipment (see 3.4.9).

* 2. Whether a design report of calculations justifying designs of skis, frames, mounting arrangements and/or method of supporting, bracing, blocking and securing components to vehicle and water shipment stability analysis is required (see 3.4.9).

(x) 1. Whether final first article inspection is required (see 4.4.4.1).

2. Whether functional tests of component after rough handling test are required (see 4.4.4.1).

* 3. Container pressure if other than specified (see 4.4.2.1 and 4.4.5.1).

6.2 Definitions.

* (a) NAVSEA or its authorized representative. The Government or prime contractor who has design and/or procurement responsibility acting under contract to the Government.

(b) Supplier. The seller under the contract or purchase order which incorporates this specification.

(c) Critical surfaces. Those surfaces which if damaged chemically (stain, corrosion products, grease, and other foreign material) or physically (abrasions, nicks, dents, etc.) would render the component unfit for the intended service.

(d) Packaging. The application or use of adequate protective measures to prevent deterioration, including as applicable, the use of appropriate preservatives, protective wrappings, cushioning, interior containers and complete identification marking, up to but not including the exterior shipping container.

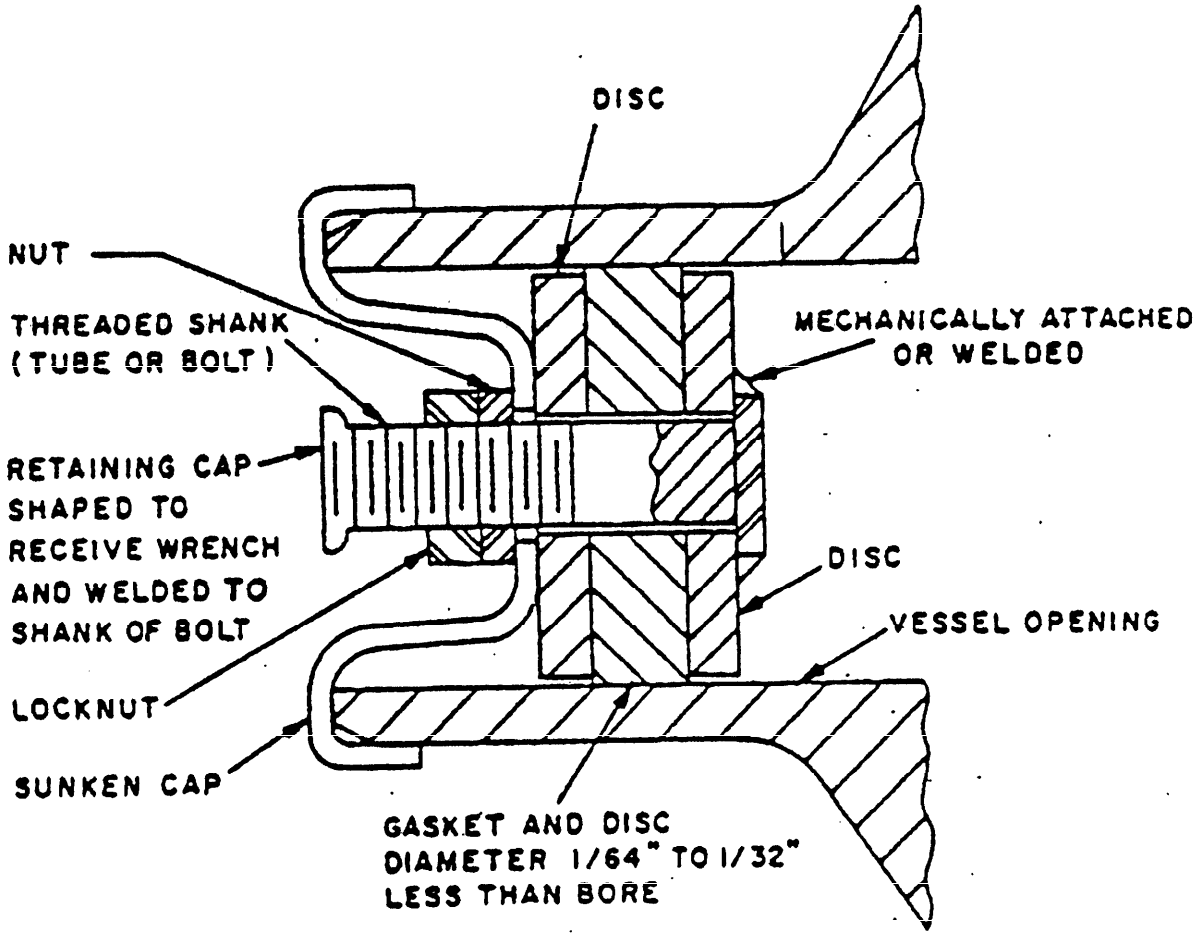
(e) Packing. The application or use of exterior shipping containers, or other shipping media, and assemblies of items or packages therein, together with necessary blocking, bracing or cushioning, weatherproofing, exterior strapping and marking of shipping containers.

(f) Quantity per unit package. The number of units of a single stock numbered item in the first tie, wrap, or container which is completely marked or identified.

* (g) Cleanliness controls. Any reference to (or application of) the cleanliness control requirements of one or more of the following documents: MIL-STD-767, MIL-STD-2041, MIL-S-23192, MIL-F-23467, MIL-F-23508, MIL-F-23509, MIL-M-24130, MIL-S-24287, MIL-F-24339, MIL-F-24342, MIL-S-24354.

6.3 Changes from previous issue. The margins of this specification are marked with asterisks to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Preparing activity:
Navy - SH
(Project PACK-N057)



NOTES:
1. Design also demonstrates protection of weld end preparation.
2. Retaining cap must be attached before plug is inserted in opening.

FIGURE 1. Schematic drawing of acceptable expandable plug.

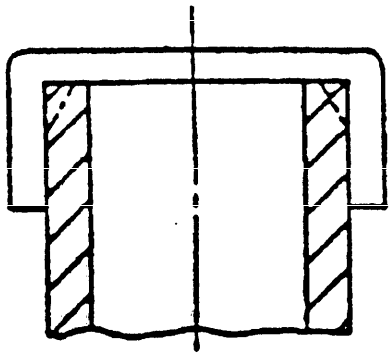


FIGURE 2

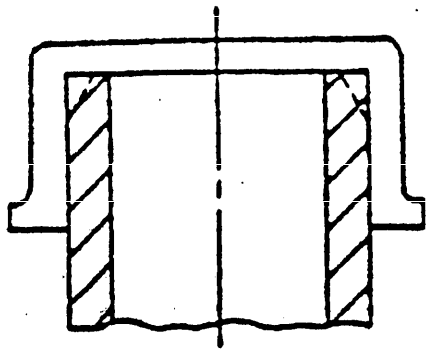


FIGURE 3

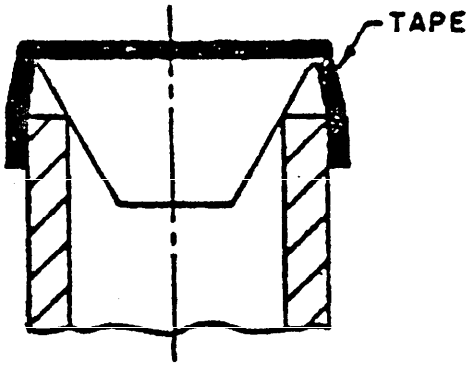


FIGURE 4

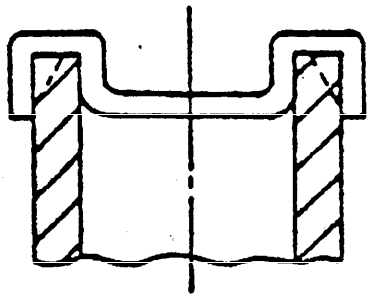


FIGURE 5

NOTES:
1. Tightly fitting (forced fit) plugs and caps are preferred.
2. Tape may be used to further secure plugs and caps if desired.
3. Figures 2, 3 and 5 demonstrate weld end protection.

NONEXPANDABLE PLUGS AND CAPS

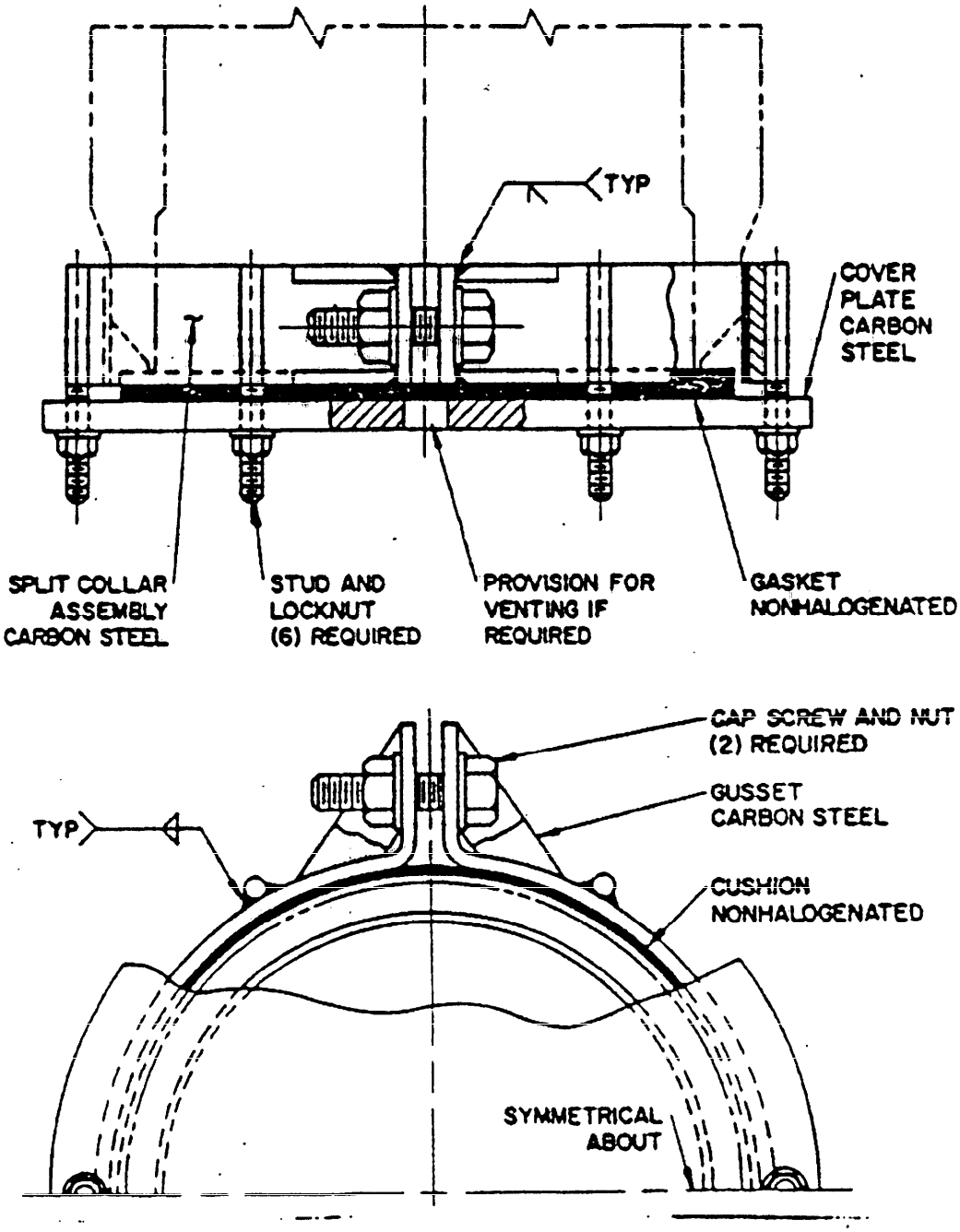


FIGURE 6. Schematic drawing for shipping cap 6 inches or larger.

VEHICLE INSPECTION REPORT TRUCKS & TRAILERS	Date: Activity Reporting:	Check One: ___ Origin ___ Destination
Name of Carrier		Point of Origin

Type of Vehicle ___ Truck ___ Truck & Trailer ___ Truck & Pull Trailer	Truck License No.	I.C.C. No.	Trailer No. & License

ITEMS TO BE CHECKED ON EMPTY VEHICLE PRIOR TO LOADING

Item. No.	Check Appropriate Column (See reverse side for explanatory notes.)	Satis-factory	Unsat-isfac-tory	REMARKS (Explain unsatisfactory items; use reverse side if necessary.)
1	Driver and Motor Carrier Inspection Reports			
2				
3				
4				
5				
6				
7				
8				
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12				

ITEMS TO BE CHECKED ON LOADED VEHICLE PRIOR TO RELEASE

13	Load Shored and Tied Down (per drawing)			
14	Side Stakes Properly Seated in Holders			
15	Adjustable Rear Wheels Properly Secured			
16	Rear Wheel Clearance to Frame or Support Structure			
17	Weight Properly Distributed/Not Overloaded			
18	Ropes, Cables, Chains Protected from In-Transit Damage			
19	Water Resistant Tarpaulin on Open Equipment			
20	Specialized Marking/Warning Signs Applied			
21	Underneath Cargo, Brake Lines, Electrical Lines			
22	Required Seals			
23	Tailgates and Doors on Closed Equipment Secured			
24				

___ Approved ___ Rejected (If rejected, give reasons on reverse side. Equipment will be approved if deficiencies are corrected prior to loading or release.)	Signature of Inspector:

FIGURE 7 - SAMPLE INSPECTION REPORT FORM FOR TRUCKS AND TRAILERS

FIGURE 7 EXPLANATORY NOTES

References in parentheses are the applicable portions of the Title 49 - Federal Motor Carrier Safety Regulations (M.C.S.R.) and DOD requirements.

Item 1, DRIVER AND MOTOR CARRIER INSPECTION REPORTS, - Verify required driver vehicle inspection and motor carrier periodic inspection reports are current and valid. (MCSR 396.11, 396.13, 396.21, 396.23)

Item 13 and 14, SECURING THE LOAD. - Inspect tie down assemblies, methods of shoring, and side stakes (as applicable) to ensure cargo is secured and protected against shifting (MCSR 392.9(a) and 393.100)

Item 15, ADJUSTABLE REAR WHEELS/AXLES. - Examine positioning parts for integrity, alignment and proper installation of any locking devices.
(MCSR 393.207)

Item 16, REAR WHEEL CLEARANCE. - Ensure that clearance between underside of vehicle (or structural members) and tires is greater than clearance from frame to axle positive stop to prevent tire damage during transit. (DOD)

Item 17, WEIGHT IS PROPERLY DISTRIBUTED AND VEHICLE IS NOT OVERLOADED. - Inspector should check the loading of the shipment to make sure that the loading plan or weight distribution recommendation furnished by the carrier is complied with and that the maximum gross weight that may be loaded on the vehicle for the particular shipment as stated by the carrier is not exceeded. (M.C.S.R. 392.9(a))

Item 18, ROPE, CABLE, CHAIN PROTECTION. - Ensure that ropes, cables or chains, etc., used to secure load are not chafed, frayed or worn and suitably protected from any protrusion that may damage them during transit. (DOD)

Item 19, WATER-RESISTANT TARPAULIN. - If shipment is made on open equipment, check to make sure the lading is properly covered with a water-resistant tarpaulin. (M.C.S.R. 392.9)

Item 20, SPECIALIZED MARKING/WARNING SIGNS. - Ensure that suitable signs are applied; i.e., "Wide-Load, Radioactive Material", as applicable to the shipping conditions or shipment instructions provided by the buyer. (DOD)

Item 21, UNDERNEATH CARGO, BRAKE LINES, ELECTRICAL LINES. - Ensure that spikes or nails used in shoring have sufficient clearance from the brake or electrical lines underneath the cargo area to prevent in-transit damage to the lines. (DOD)

Item 23, TAILGATES AND DOORS ON CLOSED EQUIPMENT SECURED. - Inspect to see that all hinges are tight in body. Check for broken latches and safety chains. Doors must close securely. (M.C.S.R. 392.9, 393.100)

REMARKS:

INSPECTION REPORT RAILROAD CARS	Date: Activity Reporting:	Check One: ___ Origin ___ Destination
Name of Owning Railroad		Point of Origin
Type Car: ___ Flat Bed ___ Drop Center	Car No.:	Other Car Identification

ITEMS TO BE CHECKED ON EMPTY VEHICLE PRIOR TO LOADING

Item. No.	Check Appropriate Column (See reverse side for explanatory notes.)	Satis-factory	Unsat-isfac-tory	REMARKS (Explain unsatisfactory items; use reverse side if necessary.)
1	Couplers			
2	Air Hoses			
3	Brakes			
4	Journal Boxes			
5	Car Frame			
6	Wheels			
7	Springs			
8	Flooring			
9	Capacity			
10	Air Tank			
11	Hand Brake			
12				

ITEMS TO BE CHECKED ON LOADED VEHICLE PRIOR TO RELEASE

13	Load Shored to Prevent Movement (per drawing)			
14	Weight Properly Distributed - Not Overloaded			
15	Water Resistant Tarpaulin on Open Equipment			
16	Accelerometer in Place (if required)			
17	Specialized Marking/Warning Signs Applied			
18	Side Bearing Clearance			
19				
20				
21				
22				
23				
24				

___ Approved ___ Rejected (If rejected, give reasons on reverse side. Equipment will be approved if deficiencies are corrected prior to loading or release.)	Signature of Inspector:

FIGURE 8 - SAMPLE INSPECTION REPORT FORM FOR RAILROAD CARS

FIGURE 8 EXPLANATORY NOTES

References in parentheses are the applicable portions of the Association of American Railroads Code of Rules for Interchange of Traffic (AARIR), the Interstate Commerce Commission United States Safety Appliance Standards (ICC).

Item 1, COUPLERS. - Check for cracks (especially transverse cracks behind knuckles), side clearances, movable from side to side, and evidence of excess wear. Couplers should be equal height at both ends of car, however, height above tracks may vary by 2 inches. (AARIR Rule 18 and 20)

Item 2, AIR HOSES. - Reject hoses which are bulged, cracked, cut or are abraided and inner fabric is cut or shows evidence of deterioration. Reject hoses which are soft or are over 8 years old (age determined by date on hose), or whose date is obliterated. (AARIR Rule 56 and 60)

Item 3, BRAKES. - Check for evidence of leakage in pipes, fittings and hoses. Check brake shoes for excessive wear or evidence of burning. Verify air brake "in-date Testing" within 48 months: date is stenciled on car frame. (AARIR Rule 60-108)

Item 4, JOURNAL BOXES. - Verify within 30 months of last lubrication: date stenciled on car frames. (AARIR Rule 65)

Item 5, CAR FRAME. - Visually inspect car frame for cracks, loose or missing rivets, excessive corrosion or cracking of strength members (pay special attention to fillets or corners). (AARIR Rule 3 and 22)

Item 6, WHEELS. - Visually inspect wheels for excessive wear, thin rims, radial cracks in hub, burnt rims. Pieces broken out of rims may not exceed 2 inches on cast iron wheels or 1-1/2 inches on cast steel wheels. Wheels having three or more areas of broken rim may indicate a cracked wheel. (AARIR Rules 71-80)

Item 7, SPRINGS. - Visually inspect springs in car trucks for cracks, broken spots or uneven height. (AARIR Rule 16)

Item 8, FLOORING. - Cracked or missing flooring should be repaired or replaced: loose sections should be secured. (AARIR Rule 4, FCR)

Item 9, CAPACITY. - Capacity of car must be equal to, or greater than, total load to be carried.

Item 10, AIR TANK. - Visually inspect holding brackets for cracks. Air date should be within 48 months: date stenciled on air tank or car frame. (AARIR Rule 50)

Item 11, HAND BRAKE. - Check hand brake for operation and visually inspect chains, rigging rods and gears for excessive wear or damage. (ICC, AARIR Rule 3)

Item 13, LOAD SHORED. - Prior contractor approved drawings shall be used to verify shipping frame, blocking and shoring. Visually inspect any welds made to secure load to car to assure sound welds: such attachment welds or any bolting should be made to car frame or car flooring directly over or adjacent to a structural member of the car frame.

Item 14, WEIGHT. - Verify car is not overloaded and properly distributed so that car is not tilted.

Item 15, WATER-RESISTANT TARPAULIN. - If shipment is made on open equipment check to make sure the component (load) is properly covered with tarpaulin. Ensure tarpaulin is protected from chafing or sharp edges to preclude in-transit damage.

Item 16, ACCELEROMETER. - Ensure accelerometer(s) are properly installed and operative when such equipment is required by the purchase order or shipping instructions.

Item 17, SPECIALIZED MARKINGS. - Ensure that suitable signs are applied: i.e., "Radioactive Material, Do Not Hump", as applicable to the shipping conditions or shipping instructions provided by the buyer.

Item 18, SIDE BEARING CLEARANCE. - Measure the distance from the top of the truck assembly to the bottom of the car on each side and each end of the car. Acceptable clearance is 1/4 to 3/8 inch. (AARIR Rule 47 and page 202 of 1973 Field Change)

REMARKS:

INSPECTION REPORT BARGES, SEAGOING	Date: Activity Reporting:	Check One: ___ Origin ___ Destination
Name of Barge Owner		Point of Origin
Barge Class	Barge No.	Other Barge Identification (Include Barge Type and Allowable Shock Loads (G-Loads))

ITEMS TO BE CHECKED ON EMPTY VEHICLE PRIOR TO LOADING

Item. No.	Check Appropriate Column (See reverse side for explanatory notes.)	Satis-factory	Unsat-isfac-tory	REMARKS (Explain unsatisfactory items; use reverse side if necessary.)
1	ABS Classified and Certified			
2	U.S. Coast Guard Certificate of Inspection			
3	Load Line			
4	Barge Condition			
5				
6				
7				
8				
9				
10				
11				
12				

ITEMS TO BE CHECKED ON LOADED VEHICLE PRIOR TO RELEASE

13	Load Shored to Prevent Movement (per drawing)			
14	List and Trim			
15	Water Resistant Tarpaulin on Open Equipment			
16	Specialized Marking/Warning Signs Applied			
17				
18				
19				
20				
21				
22				
23				
24				

___ Approved
___ Rejected (If rejected, give reasons on reverse side. Equipment will be approved if deficiencies are corrected prior to loading or release.)

Signature of Inspector:

FIGURE 9. SAMPLE INSPECTION REPORT FORM FOR BARGES

FIGURE 9 EXPLANATORY NOTES

References in parentheses are the applicable portions of the American Bureau of Shipping, Rules for Building and Classing Steel Vessels, and Code of Federal Regulations (CFR), Title 46 - Shipping, chapter I - "Coast Guard, Department of Transportation", Subchapter E - "Load Lines", Part 42; Subchapter G - "Documentation and Measurement of Vessels", Parts 67 and 69; Subchapter I - "Cargo and Miscellaneous Vessels", Parts 90 through 94.

Item 1, ABS CLASSIFIED AND CERTIFIED. - Verify barge has been classified and certified by the American Bureau of Shipping (ABS) for unrestricted ocean service. Verify annual and special periodical surveys have been performed, as required. (ABS, Parts 1.11.1, 45.1, 45.3 and 45.7; and CFR, Subparts 42.01, 42.03, 42.07 and 42.09)

Item 2, U.S. COAST GUARD CERTIFICATE OF INSPECTION. - Verify that the barge has a valid certificate of inspection if the barge is to traverse the high seas or ocean. (CFR, Part 91)

Item 3, LOAD LINE. - Verify that applicable load line markings have been applied to the barge. (CFR, Subparts 42,11, 42.13, 42.15, 42.20 and 42.50)

Item 4, BARGE CONDITION. - Visually inspect barge hull, deck, hatch covers, hatches, bilges and all accessible parts and attachments for deterioration or damage.

Item 13, LOAD SHORED. - Prime contractor approved drawings and plans shall be used to verify shipping frame, blocking and shoring. Visually inspect any welds made to secure load to barge to assure sound welds. Verify load is properly seated in saddles and cushions exhibit the correct amount of crush.

Item 14, LIST AND TRIM. - Verify load is properly distributed so that barge rides steady in the water. In addition, verify that load, after addition of ballast if necessary, does not violate load line limits, and does not set-up abnormally severe stresses in the barge. (ABS, Part 1.13.2; and CFR, Subpart 42.07 and Part 93)

Item 15, WATER-RESISTANT TARPAULIN. - If shipment is made on open equipment, check to make sure the component (load) is properly covered with tarpaulin. Ensure tarpaulin is protected from chafing or sharp edges to preclude in-transit damage.

Item 16, SPECIALIZED MARKING/WARNING SIGNS APPLIED. - Ensure that suitable signs are applied as applicable to the shipping conditions or shipping instructions provided by the buyer.

REMARKS:

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER	2. DOCUMENT DATE (YYMMDD)
	MIL-P-23199D(SH)	

3. DOCUMENT TITLE
Packaging and Packing Requirements for Special Purpose Components

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME	b. TELEPHONE (Include Area Code) (1) Commercial	(2) AUTOVON
ommander, Naval Sea Systems Command	(703) 602-8595	332-8595
c. ADDRESS (Include Zip Code) Code 05Q42 Dept of the Navy Washington, DC 20362-5160	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	